

## Ex-ante Evaluation Paper (for Japanese ODA Loan)

South Asia Division 1, South Asia Department, JICA

### 1. Name of the Project

Country: India

Project: Project for Installation of Chennai Metropolitan Area Intelligent Transport Systems

Loan Agreement: March 29, 2018

### 2. Background and Necessity of the Project

#### (1) Current State and Issues of the Road Sector in India

As rapid urbanization has progressed in India in recent years, traffic congestion due to the lack of an adequate transportation infrastructure has become a severe problem in urban areas and the economic loss associated with congestion has become a major obstacle to economic development. In light of the fact that roads carry 85.2% of passenger transport and 62.9% of freight transport in India, a Three-Year Action Agenda (Apr. 2017–Mar. 2020) set by NITI Aayog (National Institution for Transforming India Aayog) placed emphasis on the road sector development, and comprehensive development of road infrastructure in urban areas is considered vital to the country's economic growth.

Most notably, the population of the Chennai metropolitan area increased from around 6.56 million in 2001 to 8.9 million in 2011 (Source: 2011 India census), causing traffic volume in the city where most urban transport is situated to dramatically increase and worsening the already chronic traffic congestion. In 2010, the state government planned an outer ring road to ease traffic congestion in central Chennai. Although partially opened, it has already reached its maximum capacity. Thus, to respond to increased future traffic demand and promote the regional economy, the state government planned a 'Chennai Peripheral Ring Road' outside the existing ring road.

As stated above, while Tamil Nadu state government is proactively constructing new roads and widening and improving existing ones, in central Chennai, where there is little land available for new construction and expansion, the average traveling speed for ordinary roads is as slow as 15 km/h, causing serious and chronic traffic congestion. An India side survey found that the establishment of a peripheral ring road alone would not be sufficient to relieve traffic congestion in the urban Chennai including the central metropolitan area. It is unrealistic to build or widen roads in the urban center where the population density is high and there is little room for development. Therefore, alongside the construction of the peripheral ring road, it is also necessary to introduce ITS (Intelligent Transport Systems) to make effective use of the existing road infrastructure in central city areas. The 'Project for Installation of Chennai Metropolitan Area Intelligent Transport Systems' (hereinafter, "The Project") to be conducted in the Chennai metropolitan area aims to build a smooth

transportation system capable of coping with the rapidly increasing traffic volume by introducing ITS in the Chennai metropolitan area, thereby helping alleviate traffic congestion in metropolitan Chennai and promoting development of the regional economy. For this reason, the Project has been positioned as a key project for the Indian road sector.

## (2) Japan and JICA's Road Sector Cooperation Policy and the Positioning of this Project

Japan's Country Assistance Policy for India (March 2016) states that Japan's ODA is "expected to continue to play an important role in India to build critical infrastructures that ensure continued investment and strong economic growth." It also states the importance of "strengthening connectivity," and that Japan, with a view to de-bottlenecking the infrastructure constraints to investment and growth, will support the development of a transportation hub and network infrastructure to strengthen regional connectivity and connectivity among major industrial cities and economic zones.

The JICA Country Analysis Paper for India (March 2012) indicates the need to "develop and improve industrial and urban infrastructure," including acceleration of regional economic development, streamlining of logistics, and improvement of roads and other infrastructure—mainly in industrial clusters such as the economic corridors of the country's 6 major urban centers (which include Chennai). Therefore, this project is consistent with the policy and plan.

Further, the Chennai peripheral ring road has also been positioned as a priority project in the 2014 CBIC (Chennai-Bangalore Industrial Corridor) master plan study project, promoted by both Japan and India. Note that as of the end of December 2017 there were 56 ODA loan cases in the transportation sector, totaling 1.9776 trillion yen. In terms of technical cooperation, 4 projects have been implemented including the ' Master Plan Study on the Introduction of Intelligent Transport System (ITS) in Bengaluru and Mysore ' (2014–2015).

## (3) Other Donors' Activity

In the transportation sector, World Bank has provided support for the Tamil Nadu Road development project (approved in 2003; US \$348 million) as well as Phase 2 of the same project (approved in 2015; US \$300 million). Meanwhile, Asian Development Bank has provided support for the construction of roads in other states including the Karnataka State Highways Improvement Project (approved in 2010; US \$305 million) and, Rajasthan State Highway Investment Program (approved in 2017; US \$500 million).

## **3. Project Description**

### (1) Project Objective

To construct efficient traffic system to meet increasing traffic demands in Chennai metropolitan area by installing Intelligent Transport Systems (ITS), thereby contributing to mitigating traffic congestion and economic growth in Chennai metropolitan area.

(2) Project Site/Target Area

Chennai Metropolitan Region (Tamil Nadu State)

(3) Project Components

- 1) ITS equipment (including installation, commissioning, and technical transfer) Including a Traffic Information System (TIS), Traffic Management System (TMS), and Bus System (BS)
- 2) Consulting services (basic design, tender assistance, construction supervision, etc.)

(4) Estimated Project Cost

11.477 billion yen (of which, the ODA Loan amount is 8.082 billion yen)

(5) Schedule

April 2018–December 2027 (117 months in total). The project completion is defined as the completion date of trial operation of installed facilities (January 2023).

(6) Project Implementation Structure

- 1) Borrower: President of India
- 2) Guarantor: None
- 3) Executing Agency: Chennai Smart City Limited (CSCL)
- 4) Operation and Maintenance agency: CSCL is directly in charge of TIS; Chennai Traffic Police is directly in charge of TMS; and Chennai Metropolitan Transport Corporation is directly in charge of BS. O&M will be outsourced to private companies under the supervision and responsibility of each managing body.

(7) Collaboration with Other Schemes and Donors

- 1) Related aid activities by Japan: None in particular.
- 2) Aid activities of other aid organizations: None in particular.

(8) Environmental and Social Considerations/Poverty Reduction and Social Development

1) Environmental and Social Considerations

- ① Category: C
- ② Categorization Rationale: Although this project falls under the urban transportation sector listed in the 'JICA Guidelines for Environmental and Social Considerations' (promulgated in April 2010), no new road construction will be implemented in this project. Given that ITS will be established on existing roads in this project, the negative impact on the environment from this project is considered negligible.

2) Cross-cutting Items: By introducing ITS in the Chennai Metropolitan Region, this project aims to build an efficient transportation system capable of coping with the rapidly increasing traffic volume, thereby helping reduce greenhouse gas (GHG) emissions.

3) Gender Classification: GI (S) Gender Integrated Project

<Activities/Classification Rationale> In view of issues related to women's safety on public transportation in India, it is assumed that CCTVs will be installed on buses when bus system enhancement activities are carried out. Methods to effectively provide

information to both men and women shall also be examined with regard to providing information to customers at a bus terminal, an activity intended to improve user convenience. Based on the above, this project is classified as a "gender integrated project."

(9) Other Important Issues: None in particular

#### 4. Target Outcomes

(1) Quantitative Effects

Outcomes (Operation and Effect Indicators)

Indicator	Baseline (Actual value in 2017)	Target (2025) [2 Years after Completion]
Total length of the targeted main roads whose traffic information is provided (km)	47.6	245.1
Average travel speed (at peak, in km/h) for target route <sup>2</sup>	25.7	Δ10% (28.3)
Total travel Time (at peak, in minutes) on target route	152	▼ 10% (137)

1: As of 2017, road conditions at some city intersections are being broadcast on FM radio.

2: The target route is the most congested section of the 5 major highways passing through the metropolitan area (total length: 65 km)

(2) Qualitative Effects

The qualitative effects of the Project include the promotion of regional economic development in the Chennai Metropolitan Region, improved road comfort, improved connectivity between transportation means, more efficient bus operation, and a better convenience for bus users.

(3) Internal Rate of Return

Based on the following assumptions, the Economic Internal Rate of Return (EIRR) of this project is 19.26%. The Financial Internal Rate of Return (FIRR) is not calculated as collection of fees from users etc. is not expected.

[EIRR]

Cost: Cost of equipment, and O&M of the target system (excluding tax)

Benefits: Reduction of travel time cost, Reduction of vehicle operation cost

Project life: 15 years

#### 5. External Factors and Risk Control

(1) Preconditions: None in particular

(2) External Factors

1) That the political and economic situation in India and areas surrounding project do not

deteriorate, and no large-scale natural disaster occurs.

- 2) That there is no change in India central government or Tamil Nadu state government policies concerning the introduction of ITS, organizational structure and role of executing agency.

## **6. Lessons Learned from Past Projects and Applications to the Project**

Based on the ex-post evaluation results of the Vietnam-implemented 'Hanoi Urban Transport Development Project', it is important to consider the risk that plans may change in large-scale urban infrastructure projects as a result of a changing urban traffic situation, thus the plans of any related infrastructure project should be carefully examined and confirmed based on discussions with the recipient country's government.

The Project also involves several government agencies in developing and improving transportation facilities in a metropolitan area. Therefore, based on the above lesson, the plans and progress of relevant urban infrastructure development projects must be confirmed in a timely manner during the project planning and implementation stages.

## **7. Evaluation Results**

This project, will contribute to alleviating traffic congestion and promoting the regional economic development in Chennai metropolitan region, and is judged to be consistent with the Government of India's policies on development and solving issues, as well as Japan and JICA's policy on assistance. Moreover, given that the project is deemed to contribute to Goal 9 of the Sustainable Development Goals, the need for JICA to support the implementation of this project is high.

## **8. Plan for Future Evaluation**

### (1) Indicators to be Used

As indicated in sections 4. (1)-(3)

### (2) Timing of the Next Evaluation

Ex-post evaluation: Two years after the project completion